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A DESCRIPTION

OF

THREE INSTRUMENTS

FOR THE

TREATMENT OF FRACTURES OF THE LOWER JAW,
FRACTURES OF THE PATELLA,
AND FOR TYING UTERINE POLYPI.

BY

EDWARD F. LONSDALE,

Surgeon.

THREE SHILLINGS.

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Sir Richard Bruce Esq F.R.S. &c.
with the Author's Compts

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BY

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PREFACE.

THE following pages contain the description of three instruments for the treatment of fracture of the lower Jaw, fracture of the Patella, and for tying Uterine Polypi. The descriptions are meant to be merely explanatory of the different parts of which the instruments consist, of the object they are meant to attain, and of the mode of applying them. The causes, symptoms, and treatment of the injuries and disease requiring their use, are not entered into, with the exception of mentioning those that are immediately connected with the use and application of the instruments themselves.

The first instrument, namely, that for treating fractures of the lower Jaw, was invented in the year 1832, for a case of fracture through the symphysis of the bone, in which the ordinary treatment was found to be useless for keeping the portions of bone in apposition. The instrument answered exceedingly well, though it was not so perfect then as it has since been made.* The instrument for fractures of the Patella, was first applied to a case in the Middlesex Hospital in 1835, where the patient could not bear the ordinary treatment, owing to the swelling and pain in the joint, not admitting of any circular constriction being made. The man, however, bore the instrument on from the first, without experiencing any pain or inconvenience. The last instrument, namely, that for tying Uterine

* It is made at Savigny's, in St. James's Street; and by Thompson, in Great Windmill Street.

Polypi, was invented in the beginning of the present year. The objects gained by it are—the easy application of the noose round the neck of the polypus; a great power of constricting it, so as to be sure of producing strangulation; lastly, the easy removal of the whole bulky part of the instrument, merely leaving a small piece behind in connection with the ligature, and which comes away afterwards with it.*

The Author trusts that the descriptions are sufficiently explicit, and that with the aid of the drawings, the mechanism and the principle on which the instruments act, will be rendered as intelligible as they can be, without witnessing the instruments themselves, or without seeing them applied in the particular cases for which they are intended.

82, Guildford Street, Russell Square,
March, 1840.

* This instrument is made by Everard, in Charles Street, opposite Middlesex Hospital; it is beautifully finished, and works perfectly.

DESCRIPTION

OF AN

INSTRUMENT FOR THE TREATMENT

OF

FRACTURES OF THE LOWER JAW.

THE ordinary treatment adopted for fractures of the lower jaw, consists in applying a bandage round the chin, and fixing it on the top of the head, and at the back of the neck, so as to brace the lower jaw firmly against the upper; at the same time that the level of the two portions of bone is preserved by placing two pieces of cork, one on either side, between the teeth, and then pressing the jaw firmly up against them. The inconvenience and objections to this treatment are, that it will not always succeed in keeping the portions of bone in proper apposition, more particularly where the fracture is near to the symphysis. 2ndly. The counterpoint against which the pressure is made, is the upper jaw, so that it becomes necessary to press the lower one firmly against it, which causes great distress and inconvenience to the patient, by preventing him opening his mouth even to the smallest extent. 3rdly. The two jaws being so firmly pressed against one another, makes it exceedingly difficult to administer food of any kind to the patient, and also deprives him of the power of talking, which renders the treatment much more tedious and irksome than it otherwise would be.

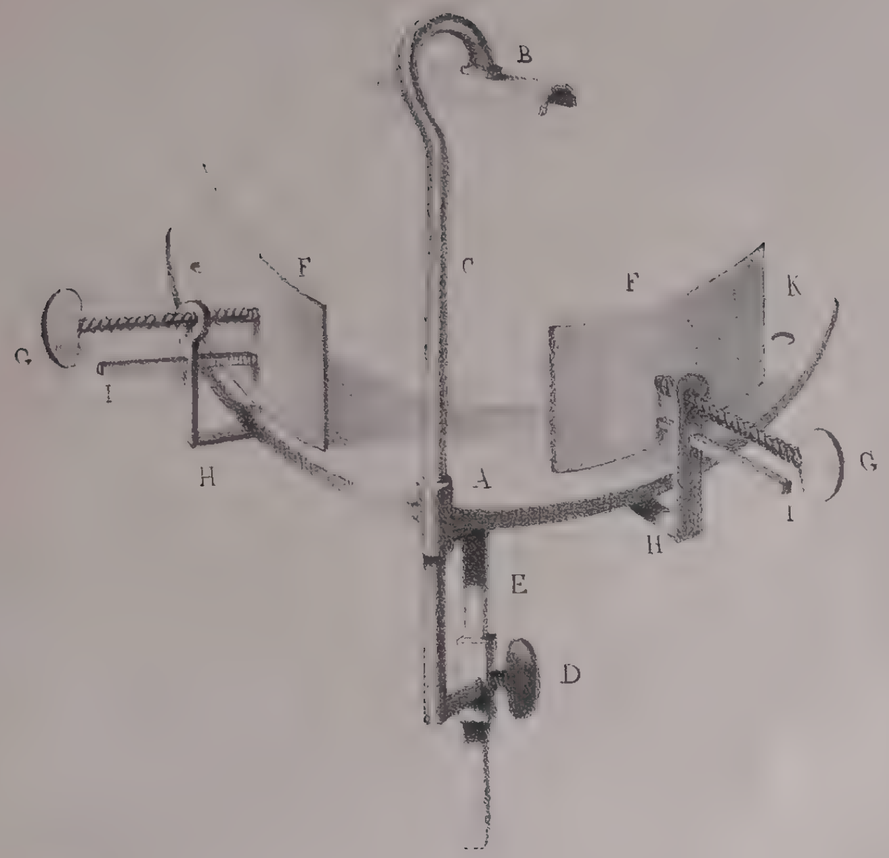
I do not mean to say, that many cases of fractures of the lower jaw are not perfectly well treated by the above means, and that the apposition of the portions of bone is not well preserved,—but I believe

that the treatment does not succeed in all, and that in most cases it is an awkward and inconvenient one, and not so advantageous as the one I am about to recommend.

The principle of the instrument which I am about to describe, is one that enables it to act on the lower jaw alone, without requiring any pressure or confinement to be made upon the upper one. This point is gained by fixing the two portions of bone between two parallel plates; by making the one press on the teeth, while the other presses from below against the under part of the jaw. These two plates are connected to one another by means of a slide and screws. The drawing represents the various parts of the instrument, which are as follows. There is a piece of wood, *a*, of a horse-shoe shape, of a size to fit the under surface of the jaw, which is padded with lint, and placed beneath the chin. There is another plate, *b*, consisting of a grooved piece of ivory, which fits on to the teeth, and is fastened into the end of a vertical rod, *c*, on which the chin piece, *a*, slides up and down. As soon as the groove, *b*, is fitted on to the teeth, the chin piece, *a*, is pushed up as far as it will go, and then fixed by means of the screw, *d*, which acts upon another slide, *e*, connected to the under part of the chin piece. It will thus be seen, that when *a* and *b* are made to press, the one on the teeth, the other against the under part of the lower jaw, that the two portions of bone must be fixed and kept in parallel apposition to one another. There are two other pieces, *f f*, which make lateral pressure against the side of the jaw, by means of the screws, *g g*, which pass through a small bar, *h*, which moves on a pivot at the under part of the chin piece, and which may be seen at Fig. 2. The plates, *f f*, are further steadied by means of two slides, *i i*, which pass through the bars, *h h*, and which prevent them twisting round, when the screws, *g g*, are turned. These plates are to be made use of when the lateral pressure is required, having placed a pad of lint on them first, when any degree of force may be employed by turning the screw, *g*. There is a hole, *k*, at either end of the chin piece, to pass two bandages through, two of the ends of which tie at the top of the head, and the other two at the back of the neck; the object of which is to prevent the instrument falling forwards.

The grooved plate, *b*, in the drawing, is meant to be used when the

Fig. 1.



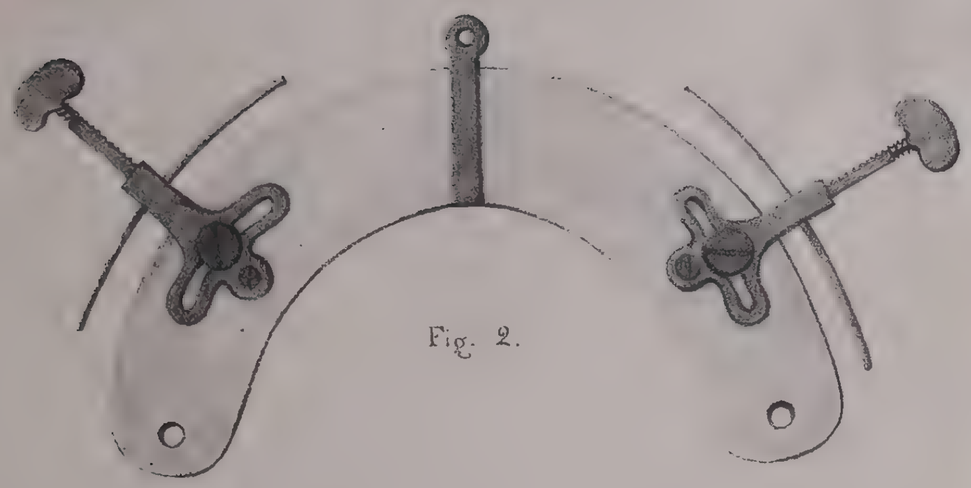
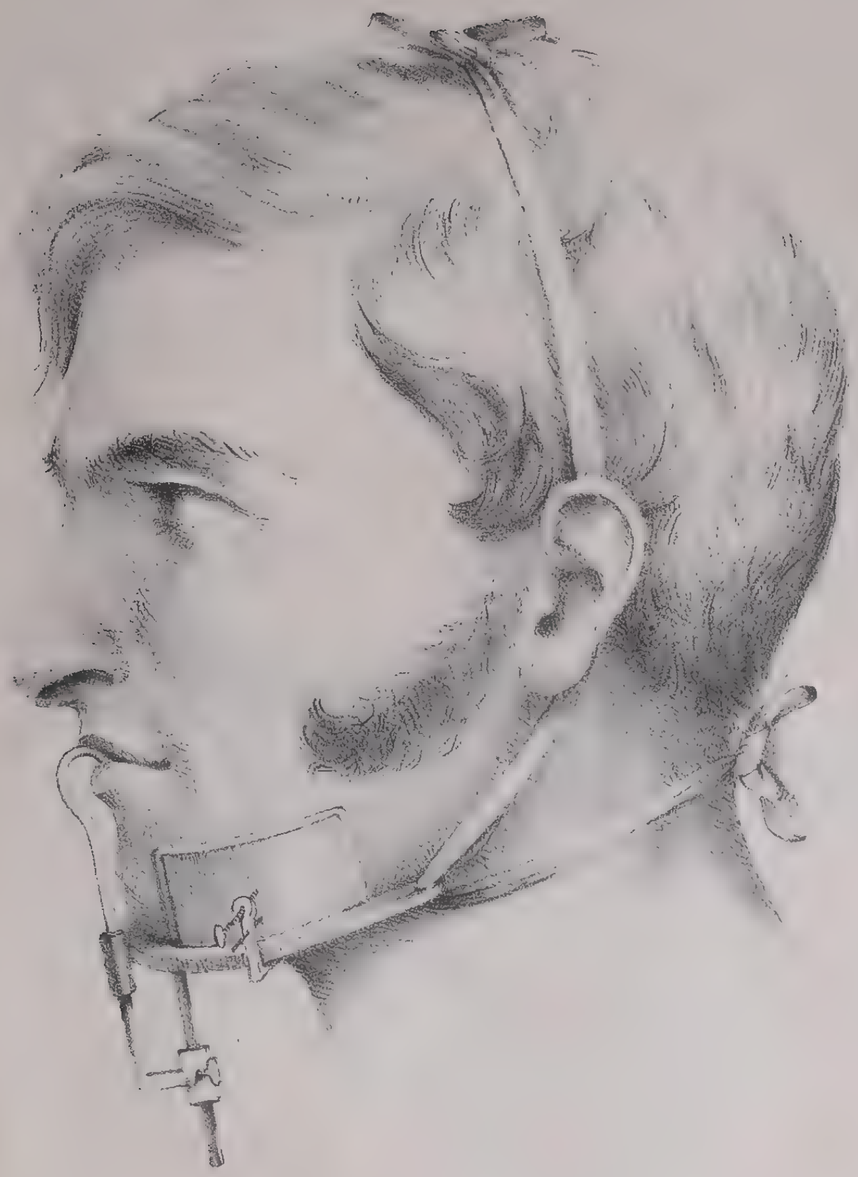


Fig. 2.

Fig. 3.



fracture is at, or just to one side of the symphysis; there are two other plates also, which are curved in opposite directions, and which are intended to fit the curve of the teeth, either on the right or left side, according to which the fracture may happen to be on. Were a double fracture to occur, so as to include both sides of the jaw, a piece with a double curve might be used, so as to include both fractures, by pressing on all the teeth.—This kind of fracture is however extremely rare.

FURTHER DESCRIPTION OF THE DRAWING.

Figure 1.

a. The chin piece, made of wood, and curved to the shape of the base of the lower jaw.

b. The grooved plate, made of ivory, and intended to press on the teeth, opposite to the fracture, so as to include the two portions of bone.

c. The vertical bar, into which *b* is fixed, and on which *a* slides up and down.

d. A screw, which turns against the vertical bar, *e*, by which the chin piece, *a*, is fixed at any level.

e. The vertical bar, which is connected to the under part of the chin piece, *a*, and which is acted on by the screw, *d*.

f f. The two lateral plates, which press against the sides of the lower jaw.

g g. Two screws, which act upon the plates, *f f*, and so press them against the sides of the jaw.

h h. The bars, through which the screws, *g g*, turn. They are connected to the under part of the chin piece, *a*, and turn upon a pivot, as represented at Fig. 2.

i i. Two slides, which steady the two plates, *f f*.

Figure 2.

The under part of the instrument is here represented, and the manner in which the lateral plates, *f f*, (Fig. 1) are connected underneath.

FIGURE 3

Shews the instrument adapted to the jaw, and the manner in which the bandage is fastened to the top of the head, and the back of the neck, to prevent the instrument falling forwards.

APPLICATION OF THE INSTRUMENT.

Supposing the fracture to be at the symphysis of the lower jaw, and the portions of bone having been brought into proper apposition, the grooved plate, *b*, is to be fitted on to the teeth, so as to include the two fractured portions. The chin piece, *a*, (having been padded with lint) is then to be placed beneath the base of the jaw, and pushed upwards on the slide, *c*, as far as it will go, taking care that the plate, *b*, keeps its place on the teeth. The screw, *d*, is then to be turned, so as to fix the rod, *e*, when of course the chin piece, *a*, will also be fixed. The two portions of bone are now confined between two parallel pressures; the one, *b*, pressing on the teeth, the other, *a*, beneath the base of the jaw; and will continue to keep them so, as long as the screw, *d*, remains fixed.

If there be any disposition for the two portions of bone to fall asunder, lateral pressure may be required; the two side plates, *f f*, may then be employed; they are made to act against the side of the jaw, by turning the screws, *g g*. These plates should have a pad of lint placed upon them. They admit of being brought nearer to the angle, or symphysis of the bone, as may be required, by means of the pivot on which they turn, and which is represented at Fig. 2 in the plate. They are fixed by means of a small screw which turns against them.

The following appear to me to be the advantages gained by the above instrument. In the first place, it admits of being applied with much greater facility than the ordinary method of using the bandages and pieces of cork; and when once applied, there is no fear of future displacement. 2ndly. The instrument is connected with the lower jaw alone, so that the patient is no longer inconvenienced by the necessity of keeping the jaws closed one against the other. 3rdly. The motion of the lower jaw is not impeded by the instrument, so that the patient can take his food with facility,

and can talk without fear of displacing the portions of bone; by which the cure is rendered much less tedious and irksome, than by the ordinary method of treatment.

The instrument is not applicable to all cases of fracture of the lower jaw, the exceptions are, when the fracture is situated far back, through either the angle or ascending ramus of the bone; but then these cases are seldom accompanied with much displacement, and do not require mechanical means to confine them. It will be requisite to remove the instrument now and then, in order to clean the upper part of the rod, which gets dirty, owing to the food and saliva collecting round it. While this is being done, the portions of bone must be held by an assistant to guard against displacement.*

* I first employed the above instrument in the year 1832, and have since tried it in many cases, and have found it to answer exceedingly well. It was first described in the 11th vol. of the London Medical Gazette.

DESCRIPTION

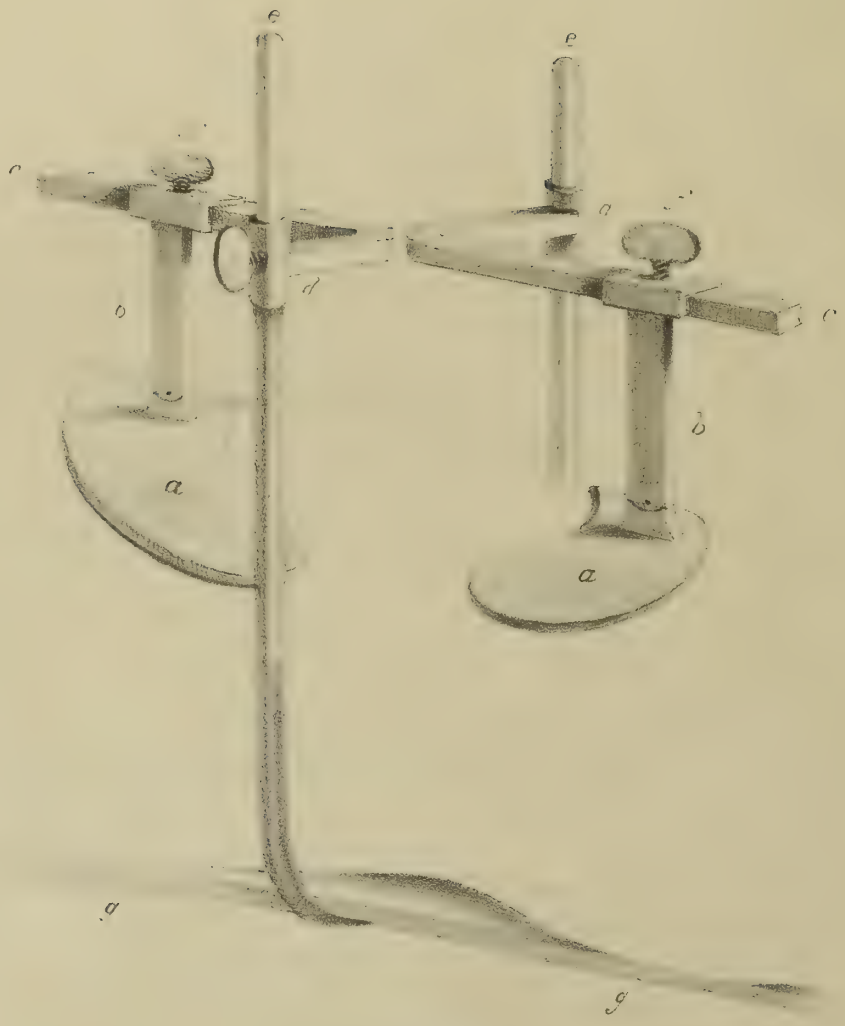
OF AN

INSTRUMENT FOR THE TREATMENT

OF

FRACTURES OF THE PATELLA.

THE position which the patella occupies in the knee joint, places it under very peculiar circumstances when it happens to meet with a fracture; for the swelling and inflammation which almost always arise after this kind of injury, render it very difficult to apply any means that shall confine the two portions of bone, at the same time that pressure on the joint itself is avoided. The consequence of which is, that it is generally found necessary to leave the part free and unconstrained, for a length of time sufficient to allow of the pain and inflammation subsiding, before the pressure which the ordinary treatment makes can be borne. This is a disadvantage which ought to be avoided if possible, for the delay allows of the portions of bone being farther separated from one another, and necessarily makes the ligament longer, which connects them together, than it would be, if they could be brought into close apposition from the first. Besides which, if bony union be possible in this kind of fracture, it totally precludes the chance of its taking place, by preventing the contact of the fractured surfaces. It was to obviate these evils, that I had the instrument made which I am about to describe. It will be seen that it gives every chance of the early approximation of the two portions, by fixing them, without making any circular constriction on the joint.


e
e
c
d
b
a
a
b
c
g
g

The instrument consists of two horse-shoe plates of metal, which rest, the one over the tendon of the quadriceps extensor cruris muscles, the other on the ligamentum patellæ; the former grasps and fixes the upper portion of bone, the latter the lower portion. These two horizontal plates (*a a* in the drawing) are connected by short vertical bars, *b b*, which slide on two horizontal bars, *c c*, so that the nearer *b b* are brought to one another, the nearer will the two portions of bone be approximated, by the plates, *a a*, being moved at the same time. The two horizontal bars, *c c*, are bent at right angles, and are connected by a slide, *d d*, to two other vertical rods, *e e*, by which means the vertical pressure of the plates, *a a*, is produced, and the portions of bone grasped. These horizontal and vertical slides are fixed in any position, by means of small screws which act against the bars on which they move. The plates, *a a*, are connected by a hinge to the bars, *b b*, to allow of their accommodating themselves more closely to the level of the surface of the limb. The two rods, *e e*, are connected to a back splint, which passes half way up the thigh, and down to the foot, where there is a foot-board attached, which slides up and down, to adapt itself to limbs of different lengths. All the parts of the apparatus where the pressure tells, are padded with lint, or flannel covered with wash leather. These parts are, the two horse-shoe plates and the back splint.

FURTHER DESCRIPTION OF THE DRAWING.

a a. The two horse-shoe plates, which are concave underneath, to fit the shape of the limb; the upper one is made larger than the lower. These two plates make the horizontal pressure, and approximate the two portions of bone.

b b. The two small bars, which are connected with the slides that move on the horizontal bars, *c c*.

c c. The horizontal bars, bent at right angles, and connected with the slides, *d d*, which move on the rods, *e e*, and so make the vertical pressure.

d d. The two slides which move the two horizontal bars, *c c*, up and down on the rods, *e e*. These two slides are fixed by small screws which work through them.

e e. The two vertical rods, placed wide enough apart to prevent pressure against the sides of the knee. They are curved at the lower part, and connected to the back splint, which is placed behind the limb.

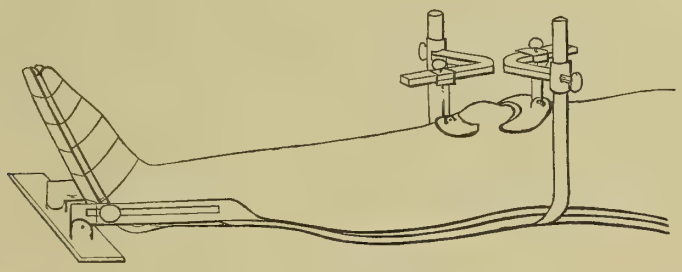
f f. The two small screws which fix the horizontal slides, and so keep the portions of bone from being drawn apart.

g g. The back splint, to which the vertical rods, *e e*, are attached.

APPLICATION OF THE INSTRUMENT.

The leg is first of all to be rolled from the toes up as far as the lower part of the knee joint, taking care not to press on the lower portion of bone. The object of this first bandage is merely to guard the skin from irritation, which might be produced by the pressure of the back splint and foot board, on which the leg and foot rest. The instrument is applied as follows :—The plates, *a a*, and the bars, *c c*, are first of all to be removed, by drawing the slides, *d d*, off the vertical rods ; the leg and foot are then to be held by an assistant, while the back splint is placed underneath the limb, and pushed up till the vertical rods, *e e*, are opposite the centre of the knee joint ; the foot-board should also correspond with the level of the foot, which it can easily be made to do, by means of the slide and screw, which connect it to the lower part of the back splint. A bandage is then to be carried round the foot and foot-board, and up the leg near to the knee, to steady the limb on the splint ; another piece of bandage is also to be passed round the thigh, beginning above the joint, and extending sufficiently high to fix the thigh part of the splint, and to confine the muscles, and so tend to diminish any disposition to spasm that may exist. The next thing is to fix the two portions of bone, and this is done by bringing the bars, *c* and *b*, down, as represented in the drawing, so that the horse-shoe plate, *a*, may press upon the tendon of the rectus muscle, and so include the upper portion of bone without pressing upon it. The verticle pressure is made by means of the slide, *d*, which can be lowered as far as required, and then be fixed by the screw connected with it. The horizontal pressure is made by bringing the sliding bar, *b*, down as much as possible, and then fixing it by the screw, *f*. It will thus be seen that the upper portion of bone admits of being fixed as near to the lower as circumstances will allow of, for if the plate, *a*, grasp it well, it

cannot escape, while the screws which fasten the slides remain fixed. The lower portion of bone is fixed in the same way, making the plate, *a*, press upon the ligamentum patellæ, just below the bone. The sliding bar, *b*, is then pushed as near to the other slide, *b*, as it can be, and then fixed by the screw, *f*. The two portions of bone are now confined by the two plates, *a a*, and without making any pressure on the joint itself, or at any rate it is on the upper part only, without making any circular constriction; besides which, the pressure that is made, tells on parts that are best able to bear it, namely, on the tendon of the rectus muscle, and on the ligamentum patellæ. The wood-cut represents the instrument when applied.



The following advantages I think are gained by the above instrument:—In the first place, there is no circular constriction made upon the joint, so that one great evil of the ordinary method of treating this kind of injury is done away with, namely, the necessity of leaving the joint without any application for so long a time, by which the upper portion of bone is drawn upwards to an extent that renders it difficult afterwards to bring it down to the lower one. By the above instrument the pressure can be borne at a much earlier period, and so enable the portions to be brought much closer than they otherwise could be; at the same time that a much better chance of bony union is given, as in some cases where the swelling is slight, the direct contact of the fractured surfaces can be procured. Secondly,—The mechanical means by which the two portions of bone are fixed, presses on the upper surface of the limb alone, and so leaves the rest of the joint free and unconstrained; under these circumstances, the instrument can be applied at a much earlier period than by the ordinary method, for this kind of pressure can be borne, when the circular constriction cannot be. Thirdly,—The whole limb is steadied on the back splint, and the foot rests

against the foot-board, so that there will be no chance of the instrument slipping, or of the knee-joint moving from its position. Finally,—The joint remains open for the application of local remedies, which can now be applied without the necessity of moving the apparatus.

I have employed the instrument in many cases, and although the ligamentous union only has been produced, the ligament formed has been much shorter, I believe, owing to the early approximation of the two portions, than it would have been by the ordinary treatment of bandages and straps.*

* I first applied the instrument in 1835, it then consisted of one plate only, to fix the upper portion of bone. I have also employed the improved one, as now described, in a great many cases, and think it possesses the advantages which I have mentioned above.

DESCRIPTION

OF AN

INSTRUMENT FOR TYING UTERINE POLYPI.

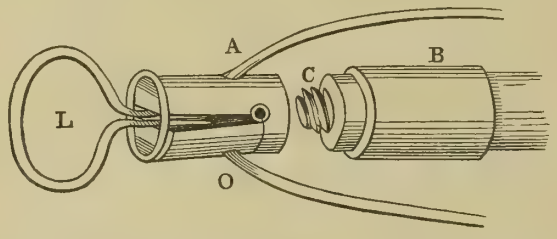
THE object of the instrument is, to pass a noose round the neck of the tumour, and then to produce a degree of constriction in it, sufficient to strangulate it, and cause it to slough off. The strangulation is kept up by means of a small piece at the end of the instrument, which prevents the noose coming loose after it has once been tightened; which small piece is only about half an inch in length, and remains behind in the vagina till the ligature comes away.

The instrument consists of two pieces, one of which is intended merely to guide the ligature round the tumour, while the other, as well as helping to guide the ligature, contains the means for strangulating the neck of the polypus, and for fixing the ligature afterwards, so as to keep up the constriction, and to prevent the noose coming loose again. The description of the instrument may perhaps appear a little complicated, but the careful reference to the different parts represented in the drawing, will facilitate the explanation, though not so much so as the demonstration of the instrument itself, together with its mode of application.

One of the pieces, Fig. 1, is merely to assist in conducting the ligature round the neck of the tumour. It consists of a thin rod, *e*, about ten inches in length, which terminates at one end in a small pair of spring blades, curved so as to form an eye when closed, to hold the ligature as represented at *a*. These blades are kept closed, by means of a long sliding cannula, *b b*, which can be drawn back at pleasure, by pulling on the end, *c*, when the blades will expand, and the ligature contained within them, be immediately disengaged. There is a ring, *d*, to pass the thumb through, to

hold the instrument by. The eye, *a*, is armed with the ligature, by pulling back the cannula, and allowing the blades to expand, and then closing them again as soon as the ligature is placed between them.

The other piece of the instrument, Fig. 2, requires to be rather longer, for the means by which the strangulation of the tumour is effected, are attached to the end of it, and which could not be conveniently done were it shorter, for then the fingers would be placed so near to the vagina, that the manipulation would be rendered awkward, and the operation more difficult to perform. It consists of a long piece, *f*, which passes down the cannula, *c c*, and which has attached to the further end of it a small piece, *a*, into which it screws. This small piece contains the contrivance by which the noose round the neck of the tumour is fixed. It consists of two small blades, one of which is moveable laterally, having a small hinge, and spring within it to keep it expanded. The other blade is fixed, and has a small ring attached to its extremity, through which the ligature passes, as well as through two small eyes, placed in the sides of either of the blades. These two eyes are represented at *o* and *a* in the plate, and the ligature is also seen passing through them, and through the small ring at the end of the immoveable blade. This part of the instrument is also represented on an enlarged scale in the wood-cut.



L, is the noose formed by the ligature, which passes through the holes, *a*, *o*; *b*, is the small slide, which fits over *a* and *o*, and presses them together, at the same time that the ends of the ligature are doubled down by it; and so completely fixes the noose that is formed round the tumour; *c*, in the wood-cut represents the screw at the end of rod on which the cannula slides, and which allows of the instrument being removed after the noose has been fixed, by pushing the slide, *b*, over the holes, through which the ligature passes at *a* and *o*. This small slide is also represented

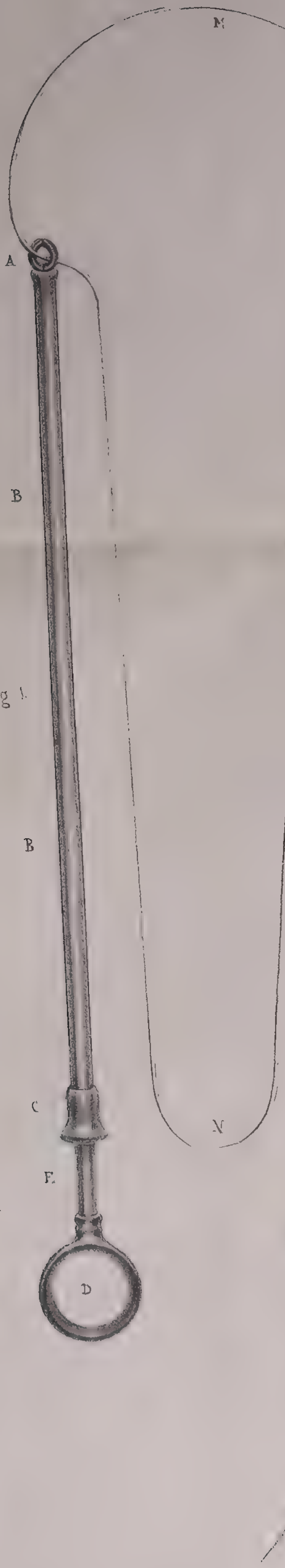


Fig 1.

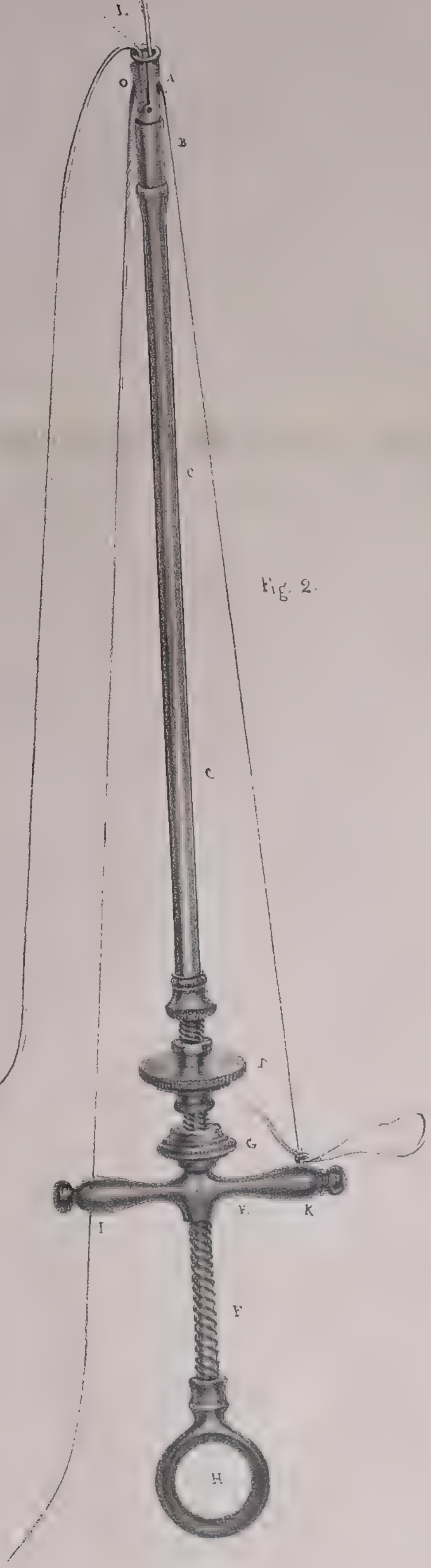


Fig. 2.

at *b* in the drawing, and *c c* is the long cannula by which it is pushed down, being acted on by turning the screw, *d*. Another part of the apparatus consists of a transverse bar, *e*, which *slides* backwards and forwards on *f*, and which is further acted on by turning the screw, *g*, against it, when it can be brought as near to *h*, as may be required. This bar is perforated by two holes, *i*, *k*, to pass the ligature through, and to fix it when required.

FURTHER DESCRIPTION OF THE DRAWING.

Figure 1.

The simple conductor of the ligature round one side of tumour.

a. The eye containing the ligature, formed by two expanding blades, which are represented as closed, by the cannula, *b b*.

b b. The long cannula, which slides backwards and forwards on the rod, *e*, and opens or shuts the eye, *a*.

c. The head of the cannula, *b b*, to allow of its being more easily held by the fingers, when required to be moved.

d. A ring to pass the thumb through, to hold the instrument more conveniently by.

e. The rod on which the cannula, *b b*, slides, and which terminates in the blades, *a*, which form the eye for the ligature to pass through.

Figure 2.

The conductor of the ligature round the other side of the tumour, and containing the means for producing the constriction or strangulation of the polypus.

a. A small silver piece (vide wood-cut also, page 12), which consists of two blades, one of which is moveable, and capable of being pressed against the other, which is immoveable, and has a small ring attached to it, through which the noose, *l*, of the ligature passes, after having passed through the eyes, *a* and *o*. This small piece is made to screw on and off to the rest of the instrument, by means of a small screw (*c*, in the wood-cut, page 12).

b. A small cylindrical slide, the length of the piece, *a*, and which fits on to it, when pushed down by the long cannula, *c c*. This small slide

is intended to close the blades, *a*, *o*, and so compress the ligature contained between them, at the same time that it doubles down the ends which pass through *a* and *o*.

c c. The long cannula, which pushes the slide, *b*, on to *a*, as just described.

d. The screw, which acts upon the cannula, *c c*, and drives it quite home, to act further on the slide, *b*.

e. The transverse bar, which *slides* on the rod, *f*, and which is meant to draw the ligature tight, after it has been fastened round the tumour, as represented by the dotted line, *l*. The ends of the ligature being first of all tied through the holes, *i* and *k*.

f. The rod, on which the cannula, *c c*, moves, and also the screws, *d* and *g*. The further end of this rod, *f*, screws into the piece, *a*, as represented on an enlarged scale in the wood-cut, page 12.

g. The screw, which acts against the transverse-bar, *e*, and so tightens the ligature, by pushing it backwards towards the ring, *h*.

h. The ring to hold the instrument more conveniently by.

i k. Two holes to pass the ligature through, and to fix their ends to, when the constriction on the tumour is required.

l. A dotted line, representing the loop that will be formed, when the instrument, Fig. 1, has been removed, and the ligature, *i*, drawn tight round the neck of the tumour.

m represents the position of the loop, as it is first placed round the tumour, before the instrument, Fig. 1, has been removed.

n represents the lower part of the loop, which is held back with the forefingers of the two hands, while the loop, *m*, is being passed round the tumour.

It will thus be seen, that the ligature is continuous, from *k* through the eye, *a*, then on to *m*, and through the eye, *a*, of Fig. 1, then down to form the loop, *n*, then through the end of the instrument, and the eye, *o*, and finally down through the hole, *i*, in the transverse-bar, *e*. The loop, *m* and *n*, will occupy the place of the dotted line, *l*, when the end, *i*, is pulled tight, and after the part, Fig. 1, has been removed altogether.

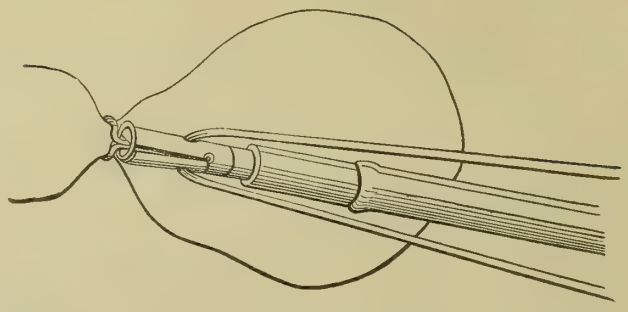
METHOD OF APPLYING THE INSTRUMENT.

The two instruments being armed with the ligature, as represented in the drawing, they are to be held one in each hand, Fig. 1 in the left hand, Fig. 2 in the right, at the same time that the noose, *n*, is pulled back by the forefinger of either hand, and held there. The two ends, *a a*, are then to be approximated and held together, while they are passed up the vagina over the tumour, until they arrive opposite the pedicle, when they are to be separated from one another, the end, *a*, of Fig. 1 being carried round the left side of the tumour, and that of Fig. 2 round the right side, until they both meet underneath it. The tumour is now encircled by the part of the ligature, *m*. This having been effected by separating the two ends of the instrument, as above described, and carrying them from the upper to the under surface of the tumour.

The instruments being held in this position, the loop, *n*, is to be drawn up to the under surface of the tumour, by pulling the loose end of the ligature through the hole, *i*, in the transverse bar, *e*, till it occupies the space of the dotted line, *l*, which will now completely surround the neck of the tumour. This being done, the conductor, Fig. 1, may be removed, not being any longer required. The end, *c*, of the cannula, *b b*, is pulled back, when the eye, *a*, opens by the blades expanding, and it then disengages itself from the ligature, and can be withdrawn at once. The tumour is then left surrounded by the noose, *l*, and connected with the piece, Fig. 2, only.

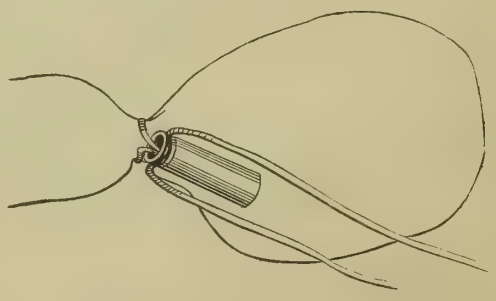
The next part of the operation is to tighten the ligature, so as to strangulate the tumour; this is done as follows. The end of the ligature, *i*, is drawn as tight as possible, by pulling it through the hole, and then tying it to the end of the transverse bar, *e*. The two ends of the ligature being now tied to the holes *i* and *k*, and any traction given to them by pulling the transverse bar, *e*, towards the ring, *h*, will of course tighten the noose, *l*, and so constrict the tumour more. And this is the way in which the strangulation of the neck of the tumour is to be effected. The transverse bar, *e*, is also further acted on by turning the screw, *g*, against it, when it will

of course be pushed nearer to *h*, and so produce greater constriction on the tumour, by pulling the loop, *l*, tighter. The wood-cut represents this step of the operation.



The next thing to be done is to fix the noose, so as to keep up the degree of strangulation that has been produced. To do this, the screw, *d*, must be turned against the long cannula, *c c*, so as to push the small slide, *b*, over the two holes, *a*, *o*, by which the ligature will be doubled down, at the same time that the two blades are pressed together, and the ligature contained between them firmly fixed by this means. As soon as the slide, *b*, comes in contact with the ligature at *a* and *o*, the screw, *g*, must be loosened with the right hand, while *d* is turned with the left, otherwise the edge of the slide, *b*, would cut the ligature in two, instead of turning it down.

The operation has proceeded thus far then; the noose has been passed round the tumour, and a degree of constriction produced in it sufficient to strangulate it, and this noose has been fixed, so that it cannot become loosened. The next step is to remove the long bulky part of the instrument, and this is done by untying the ligature at *i* and *k*, and then turning the handle, *h*, so as to unscrew the further end of the instrument, which fits into the piece, *a*. (This screw end is represented in the wood-cut, page 12.) Having unscrewed this, the whole of the instrument can then be withdrawn, with the exception of the small piece at the end, (which is little more than half an inch in length) by which the noose is fixed. The long ends of the ligature are left hanging out of the vagina, care being taken that they are not pulled upon. The wood-cut represents the small piece that is left behind, and shows the way in which the ligature is doubled down. This small piece comes away when the ligature sloughs off.



The noose can be re-tightened if required, by passing two fingers of the left hand up the vagina, along the ligature, until the small piece that is left behind is caught hold of; the long piece has then to be screwed into it, and being fixed, the two ends of the ligature only have to be pulled upon, when the slide, *b*, will fall back, and the position of the various parts of the instrument will be as they were at first, before the noose was tightened, as represented in the drawing. The noose can then be re-tightened in the same manner as before described.

The description of the instrument may appear long, but its application is very easy, and may be effected in two or three minutes, or less.

FINIS.

BY THE SAME AUTHOR,

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